



REAL-TIME IN-CIRCUIT EMULATION FOR MCS®-96 MICROCONTROLLERS

Intel's ICE™-196KC/PC In-Circuit Emulator is a low-cost, PC-card form factor emulator that delivers real-time, high-level debugging capabilities to help you develop, integrate, and test your MCS-96 microcontroller-based products.

The ICE-196KC/PC emulator supports all component variations offered in the following Intel MCS-96 families:

- 8xC196KC
- 8xC194
- 8xC196KB
- 8xC198

The emulator supports all component types as differentiated by ROM, EPROM, and ROMless; as well as components differentiated by temperature, reliability screenings, package types, and speeds (at up to 16 MHz).

FEATURES

- real-time, transparent, in-target emulation at speeds up to 16 MHz
- execution *breaks* (3 specific or 1 range breakpoint)
- execution *trace* (2048 frame trace buffer)
- 64 K-bytes of zero-waitstate, mappable ICE memory
- source-level, symbolic debugging
- stand-alone operation and self-test diagnostics
- versatile PC host software with tutorial
- hosted on IBM PC XTs, ATs, PS/2 Model 30s, and 100% compatible machines
- 30 day money back guarantee



Real-time Emulation

The ICE-196KC/PC emulator provides real-time, transparent in-circuit emulation for all components in the 8xC196KC, 8xC196KB, 8xC198, and 8xC194 micro-controller families. Running in-circuit, the emulator is able to operate at the full clock frequencies (up to 16 MHz) for all target processors.

The ICE-196KC/PC emulator connects to your target via a 16" (40 cm) flex cable. A 68-lead PLCC target adapter is included with the ICE-196KC/PC emulator. Other target adapters supporting other package types are available separately (see "Ordering Information").

Mappable Memory

The ICE-196KC/PC emulator contains 64K-bytes of zero-waitstate ICE memory that can be used to:

- execute and debug programs before target hardware exists
- simulate non-existent or non-working target memory
- overlay target EPROM space (saving time and bother by avoiding the need to program EPROMs).

The ICE memory can be set up as READ-ONLY, WRITE-ONLY, or READ/WRITE.

Trace Buffer

The ICE-196KC/PC emulator contains a 2048 frame trace buffer for keeping a history of actual instruction execution. The trace buffer can be conditionally turned off to collect a user specified number of trace frames. Trace information can be displayed as disassembled assembly instructions, or as disassembled assembly instructions intermixed with the original high-level language source code.

Breakpoints

Three execution address breakpoints or one address range breakpoint can be active at any one time. The ICE-196KC/PC emulator allows any number of breakpoints to be defined and activated when needed.

Symbolic Support and Source Code Display

Full C-96, PL/M-96, and ASM-96 language symbolics (including variable typing and scope), are supported by the ICE-196KC/PC emulator. As an example, source-level, symbolic debugging affords you the convenience of

- setting breakpoints symbolically
go til line #25
- referencing memory symbolically
display MY__ARRAY length
MY__ARRAY__SIZE as characters

You can browse through your original source code, and optionally, the high-level "C" or PL/M source will be displayed when breakpoints are reached.

Standalone Operation for Software Debugging

Code can be downloaded for execution on the target system. Or by using the supplied Crystal Power Accessory (in conjunction with the mappable ICE memory), code can be downloaded and executed in the emulator itself. This capability allows you to prototype and debug your target software prior to hardware availability.

Versatile and Powerful Host Software

The ICE-196KC/PC emulator host software features on-line help, a command line syntax guide, a built-in editor (for creating/editing PROCs, editing source, or viewing the trace buffer), an assembler/disassembler, and a macro command language (for building command procedures).

Worldwide Service, Support, and Training

To augment its development tools, Intel offers a full array of seminars, classes, workshops, field application engineering expertise, hotline technical support, and on-site service.

Intel also offers a Software Support Contract which includes technical software information, automatic distributions of software and documentation updates, *iCOMMENTS* publication, remote diagnostic software, and a development tools troubleshooting guide.

Intel's 90-day Hardware Support package includes technical hardware information, telephone support, warranty on parts, labor, material, and on-site hardware support.

Intel Development Tools also offers a 30-day, money-back guarantee to customers who are not satisfied after purchasing any Intel development tool.

SPECIFICATIONS

Host Requirements

The ICE-196KC/PC emulator is hosted on IBM PC XTs, ATs, PS/2 Model 30s, and 100% compatible machine with 640K-bytes of RAM and a hard disk running DOS 3.0 or higher. Though the emulator card plugs into a single 8-bit PC slot, two slots should be reserved for clearance.

Electrical Considerations

- Additional pin capacitance:
 - all pins 60pf
 - all pins when using an adapter with flexible cable (ex: KADPTCA68PLCC) 70pf
- Cable propagation delay:
 - best case 5.5ns
 - worst case 11.0ns
- Operating frequency: 3.5MHz to 16MHz (16MHz only with CPA)

Target Considerations

The acceptable target V_{cc} range is 4.5V to 5.5V and the maximum V_{cc} power consumption of the processor is 1.5W at 16MHz.

When entering or exiting emulation, the ICE-196KC/PC emulator will use two bytes on the user stack to store the current instruction pointer.

Environmental Characteristics

- Operating temperature: 10°C to 40°C
- Operating humidity: maximum 85% relative humidity, non-condensing

ORDERING INFORMATION

Order Code	Description
PICE196KC/PC	Complete emulator kit. Contains all required emulator hardware and software to execute stand-alone or in-target. Kit includes: <ul style="list-style-type: none">• emulator controller board (PC-card form factor)• Target Interface Board (TIB) fitted with a 68-lead PLCC adapter• Crystal Power Accessory (CPA) (required for diagnostics and stand-alone operation)• PC host software• all user documentation

NOTE: Host software is delivered on 5¼" (360Kb) and 3½" (720Kb) diskettes

Software Tools

Order Code	Description
D86C96NL	ANSI compliant, DOS-hosted "C" cross-compiler. Architectural extensions support all MCS-96 components. Optimized for real-time, embedded applications.
D86PLM96NL	DOS-hosted PL/M cross-compiler. Language features allow direct architecture access. Optimized for real-time, embedded applications.
D86ASM96NL	DOS-hosted macro assembler. Supports all MCS-96 components.

NOTE: All software tool packages include a relocater/linker (RL-96), an object-to-hex converter (OH-96), a floating point arithmetic library (FPAL-96), and a librarian (LIB-96).

Target Adapters

Order Code	Description
KADPT52PLCC	target: 52-lead PLCC components (socketed)
KADPTCA68PLCC	target: 68-lead PLCC components (socketed)
KADPTCA68PGA	target: 68-pin PGA components (socketed)
KADPT64SDIP	target: 64-pin "shrink"-DIP components (socketed)